

1 51094/GSL/E87

WHAT IS CLAIMED IS:

5 1. A test module for optically measuring color and intensity of light emitted from light-emitting devices comprising:

at least one sensor having photodetectors to filter color portions of the light from the light-emitting devices, the sensor  
10 producing a sensor signal; and

electronics for receiving and conditioning the sensor signal to produce wavelength and intensity output signals.

15 2. The test module of claim 1 wherein there are a plurality of sensors and each sensor has three photodetectors individually filtered to pass red, green, and blue portions of visible light.

20 3. The test module of claim 1 wherein the electronics include a microcontroller programmed to use a combination of all color component values to determine intensity and ratios of individual color values to algorithmically match a monochromatic input color to wavelength based on CIE color matching values.

25 4. The test module of claim 2 further comprising fiber optic cables positioned between the light-emitting devices under test and the sensors.

30 5. The test module of claim 4 wherein at least a portion of the fiber optic cable is positioned in a tube which is rigidly mounted in the test module adjacent the light-emitting devices under test.

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6.    The test module of claim 2 wherein the sensors are positioned under a light shield.

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7.    The test module of claim 1 wherein the electronics further include amplifiers and an analog multiplexer.

8.    A color and intensity test module for automated test equipment comprising:

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    a sensor assembly capable of detecting color content of light emitted from a unit under test;

    means for processing the color content to calculate intensity and wavelength data of the light emitted from the unit under test; and

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    an output interface to present the intensity and wavelength data to the automated test equipment in digital or analog form.

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9.    The test module of claim 8 wherein the sensor assembly are mounted remotely at the unit under test and electrically connected to the means for processing.

10.   The test module of claim 8 wherein the sensor assembly includes fiber optic cables used to collect light signals from the unit under test and transmit the light signals to the sensor assembly.

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11.   The test module of claim 8 wherein the means for processing uses a predefined set of color ratios based on standard color matching tables to determine wavelength by comparing the color ratios of the light emitted by the unit under test.

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12. The test module of claim 8 wherein the means for  
processing calculates wavelength based on a proportion of the  
5      red, green, and blue content of the light detected for a  
monochromatic emitting device.

13. The test module of claim 8 wherein the means for  
processing determines a white source from a unit under test when  
10      all color sensor levels contribute equally to a total input.

14. The test module of claim 8 wherein the means for  
processing further converts an input light to an analog signal  
scaled directly from nanometers to millivolts or a multiple  
15      thereof throughout a visible spectrum of 380nm to 700nm.

15. A method to test color and intensity of a light-  
emitting device comprising the steps of  
    detecting light from the light-emitting device by a  
20      three-color sensor;  
    filtering the light into levels of red, green, and  
blue;  
    conditioning the red, green, and blue levels;  
    converting the levels into digital values;  
25      generating an analog wavelength value linearly scaled  
to the visible spectrum;  
    generating an intensity value linearly representing  
luminous intensity; and  
    reading the wavelength value and the intensity value  
30      and comparing the values against expected values.

16. The method of claim 15 wherein the step of comparing  
uses a predefined set of color ratios based on standard color

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matching tables to determine wavelength by comparing the color ratios of the detected light irrespective of an absolute value.

17. The method of claim 15 wherein the step of generating a wavelength value provides a calculated wavelength output, based on a proportion of the red, green, and blue colors detected by a monochromatic emitting device.

18. The method of claim 15 wherein the step of converting converts the detected light to an analog signal scaled directly from nanometers to millivolts or a multiple thereof through a visible spectrum of 380nm to 700nm.

19. The method of claim 15 wherein the steps of conditioning and filtering condition and filter the compliment colors of red, green and blue.